

**REMARKS**

The Applicants have received and reviewed the non-final Office Action mailed March 6, 2008. The Applicants originally submitted claims 1-25 in this application. By a previous Response to a Restriction Requirement dated February 26, 2007, the Applicants withdrew claims 7-10 and 20-25. By a previous Response and Amendment dated June 25, 2007, the Applicants amended claims 1 and 11, but did not cancel any claims. By the present Response, the Applicants have not amended any claims and have not canceled any claims. Thus, claims 1-25 remain pending in this application.

***Claim Rejections Under 35 U.S.C. §103***

The Examiner rejected claims 1-2 under 35 U.S.C. §103(a) as being unpatentable over Sudo (U.S. Patent No. 6,839,335), further in view of Dent (U.S. Patent No. 6,680,928) and Hoang et al. (U.S. Patent Publication No. 2004/0246973). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

Nothing in Sudo alone or in combination with Dent and Hoang et al. discloses or suggests the Applicants' invention as recited in independent claim 1. More specifically, nothing in Sudo alone or combined with Dent and Hoang et al. discloses or suggests allocating coded signals, from a plurality of spread spectrum encoders, that correspond to the same bit of the spreading codes to a respective one of a plurality of transmission channels, and wherein, in each transmission channel, the same bits from each of coded signals are analog summed to generate an optical modulation signal.

In Sudo, the entire spread transmission signal output from each of the corresponding spreading sections (1) are added together using the addition section (2). There is no disclosure or suggestion of allocating any individual bits from any of the spread transmission signals output from their respective spreading section. The addition section (2) combines the entire spread transmission signal from each of the spreading sections (1) to generate a single, composite signal, which then is input into an S/P (serial to parallel) converter (3).

The Examiner cited Fig. 1 and col. 1, lines 57-64 of Sudo to allegedly disclose the Applicants' step of allocating coded signals corresponding to the same bit of the spreading codes to a respective one of a plurality of transmission channels. However, the cited language actually refers to a portion of Inverse Fourier Transform processing by an IFFT processing section (4), which subjects chip data sequences to frequency division multiplexing. The chip data sequences are output from the S/P converter (3), which divides the added spread transmission signals (from the addition section) for each spread signal and disassembles the spread transmission signals for each spread signal into a plurality of chips corresponding to the spreading section spreading factor (k). Nothing in this cited language, or anywhere else in Sudo, discloses or suggests allocating the same bits of coded signals from a plurality of spread spectrum encoders to a respective one of a plurality of transmission channels, much less summing those same bits in each transmission channel to generate a corresponding modulation signal. The cited language in Sudo refers to assigning chips disassembled from the added combination of the plurality of spread transmission signals to corresponding subcarriers. This language clearly does not disclose or suggest the Applicants' claim 1 step of allocating coded signals corresponding to the same bit of the spreading codes to a respective one of a plurality of transmission channels.

As shown in the Applicants' Fig. 2, each spread-spectrum encoder has a plurality of outputs, each corresponding to a different bit of the coded signals of the spreading codes. The same bits from the same respective outputs of each of the spread-spectrum encoder are analog summed in one of a corresponding plurality of transmission channels. In Sudo (Fig. 1), each spreading section (1) has only a single output, and each output directs its entire spread transmission signal to the addition section (2), where all of the entire spread transmission signals are added. Nothing in Fig. 1 of Sudo or the corresponding discussion in Sudo discloses or suggests multiple outputs from each spreading section for allocating the same portion (bits) of each spread transmission signal output therefrom to a different analog summer corresponding to a different transmission channel.

Dent, which is cited for its disclosure of a combiner (24) that combines a plurality of spread-spectrum coded signals, does not cure the deficiencies of Sudo with respect

to disclosing or suggesting the Applicants' invention as recited in claims 1-2. More specifically, the single combiner in Dent combines the entire spread-spectrum coded signal of a plurality of spread-spectrum coded signals to generate a single, composite modulation signal. Such combining of entire spread-spectrum coded signals is similar to Sudo's addition of entire spread transmission signals, as discussed above. There is no disclosure or suggestion in Dent of summing the same bits of each of a plurality of spreading code coded signals using a corresponding plurality of analog summers for each of the same bits from each of the plurality of spreading code coded signals to generate a corresponding plurality of modulation signals.

Hoang et al., which is cited for its disclosure of wavelength division multiplexing as a form of frequency division multiplexing, is unrelated to the differences between the Applicants' invention as recited in claim 1 and Sudo, and therefore does not cure the deficiencies of Sudo and Dent with respect to disclosing or suggesting the Applicants' invention as recited in claim 1.

For at least these reasons, Sudo in combination with Dent and Hoang et al. does not disclose or suggest the Applicants' invention as recited in claim 1. The remaining rejected claim, claim 2, depends directly from claim 1, and therefore is not disclosed in or suggested by the cited art at least because of its dependency from claim 1. Accordingly, the Applicants respectfully request that the Examiner withdraw the rejection of claims 1-2 under 35 U.S.C. §103(a) as being unpatentable over Sudo and further in view of Dent and Hoang et al.

The Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent, and Hoang et al., and further in view of Shattil (U.S. Patent Publication No. 2002/0150070). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in claim 1 is neither disclosed in nor suggested by Sudo combined with Dent and Hoang et al. Shattil, which is cited for its disclosure of the use of quasi-orthogonal spreading codes, does not cure the deficiencies of Sudo, Dent and Hoang et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 1. Accordingly, the

Applicants respectfully submit that Shattil in combination with Sudo, Dent and Hoang et al. does not disclose or suggest the Applicants' invention as recited in claim 1.

Claim 3 depends directly from independent claim 1, and incorporates all of the features of claim 1. Furthermore, claim 3 includes other features that, when combined with the subject matter of claim 1, are neither shown in nor suggested by the art of record. For at least these reasons, the Applicants respectfully submit that claim 3 is patentable over Sudo, Dent and Hoang et al., and further in view of Shattil, and respectfully request that the rejection be withdrawn.

The Examiner rejected claims 4 and 5 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Hoang et al., and further in view of van der Gracht et al. (U.S. Patent No. 4,835,517). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 1 is neither disclosed in nor suggested by Sudo in combination with Dent and Hoang et al. The van der Gracht et al. reference, which is cited for its disclosure of the use of data spreading using exclusive-NORing, does not cure the deficiencies of Sudo, Dent and Hoang et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 1. Accordingly, the Applicants respectfully submit that the van der Gracht et al. reference, taken either alone or in combination with Sudo, Dent and Hoang et al., does not disclose or suggest the Applicants' invention as recited in claim 1.

The rejected claims 4 and 5 depend directly or indirectly from claim 1, and incorporate all of the features of claim 1. Furthermore, claims 4 and 5 include other features that, when combined with the subject matter of claim 1, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 4 and 5 under 35 U.S.C. §103(a) over Sudo in view of Dent and Hoang et al., and further in view of van der Gracht et al.

The Examiner rejected claim 6 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Hoang et al., further in view of Balachandran et al. (U.S. Patent No. 7,187,715). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 1 is neither disclosed in nor suggested by Sudo alone or in combination with Dent and Hoang et al. The Balachandran et al. reference, which is cited for its disclosure of spreading an information signal by multiplying each bit of the information signal with the corresponding bit of a spreading code, does not cure the deficiencies of Sudo, Dent and Hoang et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 1. Accordingly, the Applicants respectfully submit that the Balachandran et al. reference, either alone or in combination with Sudo, Dent and Hoang et al., does not disclose or suggest the Applicants' invention as recited in claim 1.

The rejected claim 6 depends directly from claim 1 and incorporates all of the features of claim 1. Furthermore, claim 6 includes other features that, when combined with the subject matter of claim 1, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claim 6 under 35 U.S.C. §103(a) over Sudo, Dent and Hoang et al., and further in view of Balachandran et al.

The Examiner rejected claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over Sudo and further in view of Dent and Ahn et al. ("A Symmetric-Structure CDMA-PON System and Its Implementation," IEEE PHOTONICS TECHNOLOGY LETTERS, Vol. 14, No. 9, September 2002). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed hereinabove, nothing in Sudo alone or combined with Dent discloses or suggests a signal allocator that allocates the coded signals corresponding to the same bits of the spreading code to a respective one of a corresponding plurality of transmission channels, wherein the same bits from each of the coded signals allocated to a given transmission channel are summed using a corresponding analog summer, and wherein, in each transmission channel, the output of the corresponding analog summer is used as a modulation input to an optical transmitter. The Applicants' invention as recited in claims 11 and 12 includes a signal allocator for allocating coded signals corresponding to the same bit of the spreading codes to a respective one of the transmission channels and, in each transmission channel, an analog summer with an

output connected to the modulation input of a transmitter. Each analog summer sums respective bits from each of the spread spectrum encoded information signals, i.e., the first analog summer sums the first bits from each of the spread spectrum encoded information signals, the second analog summer sums the second bits from each of the spread spectrum encoded information signals bits, and so on. Nothing in Sudo alone or combined with Dent discloses or suggests such elements, and therefore does not disclose or suggest the Applicants' invention as recited in claims 11 and 12.

The Ahn et al. reference, which is cited for its disclosure of a WDM-CDMA transmitter, does not cure the deficiencies of Sudo and Dent with respect to disclosing or suggesting the Applicants' invention as recited in claims 11 and 12. Accordingly, the Applicants respectfully submit that the Ahn et al. reference, either alone or in combination with Sudo and Dent, does not disclose or suggest the Applicants' invention as recited in claims 11 and 12. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over Sudo and further in view of Dent and Ahn et al.

The Examiner rejected claim 13 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of Shattil (U.S. Patent Publication No. 2002/0150070). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in claim 11 is neither disclosed in nor suggested by Sudo combined with Dent and Ahn et al. Shattil, which is cited for its disclosure of the use of quasi-orthogonal spreading codes, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 11. Accordingly, the Applicants respectfully submit that Shattil in combination with Sudo, Dent and Ahn et al. does not disclose or suggest the Applicants' invention as recited in claim 11.

Claim 13 depends directly from independent claim 11, and incorporates all of the features of claim 11. Furthermore, claim 13 includes other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. For at least these reasons, the Applicants respectfully submit that claim

13 is patentable over Sudo, Dent, and Ahn et al., and further in view of Shattil, and respectfully request that the rejection be withdrawn.

The Examiner rejected claims 14-16 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of Way (U.S. Patent Publication No. 2002/0021464). The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in claim 11 is neither disclosed in nor suggested by Sudo combined with Dent and Ahn et al. The Way reference, which is cited for its disclosure of an optical transmitter, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or suggesting the Applicants' invention. Accordingly, the Applicants respectfully submit that the Way reference, either alone or in combination with Sudo, Dent and Ahn et al., does not disclose or suggest the Applicants' invention as recited in claim 11.

The rejected claims 14-16 depend directly or indirectly from independent claim 11, and incorporate all of the features of claim 11. Furthermore, claims 14-16 include other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 14-16 under 35 U.S.C. §103(a) over Sudo, Dent and Ahn et al., and further in view of the Way reference.

The Examiner rejected claims 17 and 18 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of van der Gracht et al. The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 11 is neither disclosed in nor suggested by Sudo in combination with Dent and Ahn et al. The van der Gracht et al. reference, which is cited for its disclosure of the use of data spreading using exclusive-NORing, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 11. Accordingly, the Applicants respectfully submit that the van der Gracht et al. reference, either alone or in combination with Sudo, Dent and Ahn et al., does not disclose or suggest the Applicants' invention as recited in claim 11.

The rejected claims 17 and 18 depend directly from claim 11, and incorporate all of the features of claim 11. Furthermore, claims 17 and 18 include other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claims 17 and 18 under 35 U.S.C. §103(a) over Sudo, Dent and Ahn et al., and further in view of van der Gracht et al.

The Examiner rejected claim 19 under 35 U.S.C. §103(a) as being unpatentable over Sudo, Dent and Ahn et al., and further in view of Balachandran et al. The Applicants respectfully traverse the rejection in view of the remarks set forth below.

As discussed previously herein, the Applicants' claimed invention recited in independent claim 11 is neither disclosed in nor suggested by Sudo alone or in combination with Dent and Ahn et al. The Balachandran et al. reference, which is cited for its disclosure of spreading an information signal by multiplying each bit of the information signal with the corresponding bit of a spreading code, does not cure the deficiencies of Sudo, Dent and Ahn et al. with respect to disclosing or suggesting the Applicants' invention as recited in claim 11. Accordingly, the Applicants respectfully submit that the Balachandran et al. reference in combination with Sudo, Dent and Ahn et al., does not disclose or suggest the Applicants' invention as recited in claim 11.

The rejected claim 19 depends directly from claim 11 and incorporates all of the features of claim 11. Furthermore, claim 19 includes other features that, when combined with the subject matter of claim 11, are neither shown in nor suggested by the art of record. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of claim 19 under 35 U.S.C. §103(a) over Sudo, Dent and Ahn et al., and further in view of Balachandran et al.

**CONCLUSION**

In view of the foregoing, the Applicants respectfully submit that all rejections have been overcome and/or traversed and that the application now is in full condition for allowance. Accordingly, the Applicants earnestly solicit early and favorable action. Should there be any further questions or reservations, the Examiner is urged to telephone the Applicants' undersigned attorney at (770) 709-0012.

Respectfully submitted,

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